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GGSIPU mathematics 2006

1. if the regression coefficient of Y on X is 4/3,then the regression coefficient of X and Y :

 (a) is $\frac{3}{4}$ (b) is less than $\frac{3}{4}$

 (c) is less than 1 (d) can take any value

2. Which of the following is the inverse of the proposition.'If a number is prime then it is odd' ?

 (a) If a number is not a prime then it is odd

 (b) If a number is not a prime then it is not odd

 (c) If a number is not odd then it is not a prime

 (d) If a number Is odd then it is a prime

3. What must be the matrix X if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

 (a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$

 (c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

4. The value of $\begin{vmatrix} 1 & 1 & 1 \\ bc & ca & ab \\ b+c & c+a & a+b \end{vmatrix}$ is :

 (a) 1

 (b) 0

 (c) (a-b) (b-c) (c-a)

 (d) (a+b) (b+c) (c+a)

5. The value of $\begin{vmatrix} 441 & 442 & 443 \\ 445 & 446 & 447 \\ 449 & 450 & 451 \end{vmatrix}$ is :

 (a) 441x446x4510

 (b) 0

 (c) -1

 (d) 1

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6. $(\vec{a}.\hat{i})\,\hat{i} + (\vec{a}.\hat{j})\,\hat{j} + (\vec{a}.\hat{k})\,\hat{k}$ is equal to :

(a) $\vec{a}$ (b) $2\vec{a}$

(c) $3\vec{a}$ (d) $\vec{0}$

7. Inverse of the matrix $\begin{bmatrix}\cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta\end{bmatrix}$ is :

(a) $\begin{bmatrix}\cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta\end{bmatrix}$ (b) $\begin{bmatrix}\cos 2\theta & \sin 2\theta \\ \sin 2\theta & -\cos 2\theta\end{bmatrix}$

(c) $\begin{bmatrix}\cos 2\theta & \sin 2\theta \\ \sin 2\theta & \cos 2\theta\end{bmatrix}$ (d) $\begin{bmatrix}\cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta\end{bmatrix}$

8. If $^{0}\vec{a}^{0} = 3$, $^{0}\vec{b}^{0} = 4$,then a value of ^{a} for which $\vec{a} + {}^{a}\vec{b}$ is perpenqular to $\vec{a} - {}^{a}\vec{b}$ is :

(a) $\frac{9}{16}$ (b) $\frac{3}{4}$

(c) $\frac{3}{2}$ (d) $\frac{4}{3}$

9. The projection of $\vec{a} = 2\hat{i} + 3\hat{j} - 2\hat{k}$ on $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ is :

(a) $\frac{1}{\sqrt{14}}$ (b) $\frac{2}{\sqrt{14}}$

(c) $\sqrt{14}$ (d) $\frac{-2}{\sqrt{14}}$

10. A line passes through the points (6,-7,-1) and (2.-3,1).The direction consines of the line so directed that the angle made by it with the positive direction of x-axis is acute,are :

(a) $\frac{2}{3}, -\frac{2}{3}, -\frac{1}{3}$ (b) $-\frac{2}{3}, \frac{2}{3}, \frac{1}{3}$

(c) $\frac{2}{3}, -\frac{2}{3}, \frac{1}{3}$ (d) $\frac{2}{3}, \frac{2}{3}, \frac{1}{3}$

11. The maximum of the function 3cos x – 4sin x is :

(a) 2 (b) 3

(c) 4 (d) 5

12. If the distance's metres traversed by particle in t seconds is given by $s = t^3 - 3t^2$,then the velocity of the particle when the acceleration is zero,in m/s. is :

(a) 3 (b) -2

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(c) -3 (d) 2

13. For the curve $y^n = a^{n-1}$ x if the subnormal at any point is a constant then n is equal to :

(a) 1 (b) 2

(c) -2 (d) -1

14. If x = A cos 4t + B sin 4t then $\frac{d^2x}{dt^2}$ is equal to :

(a) -16x (b) 16x

(c) x (d) - x

15. If tangent to the curve $x = at^2, y = 2at$ is perpendicular to x-axis,then its points of contact is :

(a) (a,a) (b) (0,a)

(c) (0,0) (d) (a,o)

16. The general solution of the differential equation

$\frac{dy}{dx} + \frac{1+\cos 2y}{1-\cos 2x} = 0$ is given by :

(a) tan y cot x = c (b) tan y – cot x =c

(c) tan x – cot y = c (d) tan x + cot y = c

17. The degree of the differential equation

$\left(1+\left(\frac{dy}{dx}\right)^2\right)^{3/4} = \left(\frac{d^2y}{dx^2}\right)^{1/3}$ is :

(a) 2 (b) 4 (c) 9 (d) 1

18. The area enclosed between the cuurvs $y= x^3$ and $y = \sqrt{x}$ is,(in square units) :

(a) $\frac{5}{3}$ (b) $\frac{5}{4}$

(c) $\frac{5}{12}$ (d) $\frac{12}{5}$

19. $\int_0^{\pi/8} cos^3\ 4\bar{}\ d\bar{}$ is equal to :

(a) $\frac{5}{3}$ (b) $\frac{5}{4}$

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(c) $\frac{1}{3}$ (d) $\frac{1}{6}$

20. $\int_0^{\pi/2} \frac{\cos x - \sin x}{1+\cos x \sin x}$ dx is equal to :

(a) 0 (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

21. If $ax^2 - y^2 + 4x - y = 0$ represents a pair of lines,then a is equal to :

(a) -16 (b)16 (c) 4 (d) -4

22. What is the equation of the locus of a point which moves such that 4 times its distance from the x-axis is the square of its distance from the origin ?

(a) $x^2+y^2-4y = 0$ (b) $x^2+y^2-4^0 y^0 = 0$

(c) $x^2+y^2-4x = 0$ (d) $x^2+y^2-4^0 x^0 = 0$

23. Equation of the straight line making equal intercepts on the axes and passing through the point (2,4) is :

(a) 4x-y-4 = 0 (b) 2x+y-8 = 0

(c) x+y-6 = 0 (d) x+2y-10 = 0

24. If the area of the triangle with vertices (x,0),(1,1) and (0,2) I 4 sq units,then the value of x is :

(a) -2 (b) -4 (c) -6 (d) 8

25. $\lim_{\theta \to \frac{\pi}{2}} \frac{\frac{\pi}{2} - \theta}{\cot \theta}$

(a) 0 (b) -1 (c) 1 (d) ã

26. The probability that A can solve a problem is 2/3 and B can solve it is ¾.If both attempt the problem what is the probability that the problem gets solved ?

(a) 11/12 (b) 7/12

(c) 5/12 (d) 9/12

27. The radius of the circle passing through the point (6,2) and two whose diameters are x+y =6 and x+2y = 4 is :

(a) 4 (b) 6 (c) 20 (d) $\sqrt{20}$

28. If (0,6) and (0,3) are respectively the vertex and focus of a parabola,then its equation its :

(a) $x^2+12y = 72$ (b) $x^2-12y = 72$

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(c) $y^2-12x = 72$ (d) $y^2+12x = 72$

29. For the ellipse

$24x^2 + 9y^2 -150x-90y +225 = 0$ the eccentricity e is equal to :

(a) $\frac{2}{5}$ (b) $\frac{3}{5}$ (c) $\frac{4}{5}$ (d) $\frac{1}{5}$

30. If the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{b^2}=1$ and the hyperbola $\frac{x^2}{144}-\frac{y^2}{81}=\frac{1}{25}$ coincide,then the value of b^2 is :

(a) 1 (b) 7

(c) 5 (d) 9

31. The differential coefficient is f(sin x) with respect to x where f(x) = log x is :

(a) tan x (b) cot x

(c) f(cos x) (d) $\frac{1}{x}$

32. If f(x) = $\begin{cases}\frac{1-\cos x}{x} & x\neq 0\\ k & x=0\end{cases}$ is continuous at x=0,then the value of k is :

(a) 0 (b) $\frac{1}{2}$

(c) $\frac{1}{4}$ (d) $-\frac{1}{2}$

33. If $\mu = \frac{-1+\sqrt{3i}}{2}$ then $(3+\mu+3\mu^2)^4$ is :

(a) 16 (b) -16 (c) 16 μ (d) 16 μ^2

34. If $y = \tan^{-1}(\sec x - \tan x)$,then $\frac{dy}{dx}$ is equal to :

(a) 2 (b) -2

(c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

35. If $x+\frac{1}{x} = 2\cos\sim$ then $x^n+\frac{1}{x^n}$ is equal to :

(a) $2^n \cos\sim$ (b) $2^n \cos n\sim$

(c) $2i \cos n\sim$ (d) $2\cos n\sim$

36. $\int_{-1}^{1} /1 - x^0$ dx is equal to :

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(a) -2 (b) 0 (c) 2 (d) 4

37. $\int \frac{dx}{x(x^7+1)}$ is equal to :

(a) $\log\left(\frac{x^7}{x^7+1}\right)+c$ (b) $\frac{1}{7}\log\left(\frac{x^7}{x^7+1}\right)+c$

(c) $\log\left(\frac{x^7+1}{x^7}\right)+c$ (d) $\frac{1}{7}\log\left(\frac{x^7+1}{x^7}\right)+c$

38. If a sphere of constant radius k passes through the origin and meets the axis in A,B,C then the centroid of the triangle ABC lies on :

(a) $x^2+y^2+z^2 = k^2$

(b) $x^2+y^2+z^2 = 4k^2$

(c) $9(x^2+y^2+z^2)= 4k^2$

(d) $9(x^2+y^2+z^2)= k^2$

39. $\int \frac{dx}{x^{2+2x+2}}$ is equal to :

(a) $\sin^{-1}(x+1)+c$

(b) $\sin h^{-1}(x+1)+c$

(c) $\tan h^{-1}(x+1)+c$

(d) $\tan^{-1}(x+1)+c$

40. If a tangrnt to the curve $y = 6x - x^2$ is parallel to the line 4x-2y-1 = 0,then the point of tangency on the curve is :

(a) (2,8) (b) (8,2)

(c) (6,1) (d) (4,2)

41. A four digit number is formed of the figures 1,2,3,5 with no repetitions.The probability that the number is divisible by 5 is :

(a) $\frac{3}{4}$ (b) $\frac{1}{4}$

(c) $\frac{1}{8}$ (d) none of these

42. The number of solutions for the equation $x^2 - 5^0 x^0 + 6 = 0$ is :

(a) 4 (b) 3 (c) 2 (d) 1

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43. How many numbers of 6 digits can be formed from the digits of number 112233 ?

(a) 30 (b) 60 (c) 90 (d) 120

44. The last digit in 7^{300} is :

(a) 7 (b) 9 (c) 1 (d) 3

45. If $\frac{\log x}{a-b} = \frac{\log y}{b-c} = \frac{\log z}{c-a}$, then xyz is equal to :

(a) 0 (b) 1 (c) -1 (d) 2

46. The smallest positive integer n for which $(1+i)^{2n} = (1-i)^{2n}$ is :

(a) 1 (b) 2 (c) 3 (d) 4

47. If $\cos^{-1} p + \cos^{-1} q + \cos^{-1} r = ®$ then $p^2+q^2+r^2+2pqr$ is equal to :

(a) 3 (b) 1 (c) 2 (d) -1

48. If $\sin^{-1}\frac{x}{5} + \text{cosec}^{-1}\frac{5}{4} = \frac{\pi}{2}$, then x is equal to :

(a) 1 (b) 4 (c) 3 (d) 5

49. If 0á xá® and $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, then x is equal to :

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{2}$

(c) $\frac{\pi}{4}$ (d) $\frac{3\pi}{4}$

50. The equation of the director circle of the hyperbola $\frac{x^2}{16} - \frac{y^2}{4} = 1$ is given by :

(a) $x^2+y^2 = 16$ (b) $x^2+y^2 = 4$

(c) $x^2+y^2 = 20$ (d) $x^2+y^2 = 12$

51. If Q_1 is the set of all relations other than 1 with the binary operation * defined by a*b = a+b-ab for all a,b in Q_1 with respect to * is :

(a) 1 (b) 0 (c) -1 (d) 2

52. The circle $x^2+y^2-8x+4y+4 = 0$ touches :

(a) x-axis (b) y-axis

(c) both axis (d) neither x-axis nor y-axis

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53. The function f(x) = log(1+x) - $\frac{2x}{2+x}$ is increasing on :

(a) (0,ã) (b) (- ã,0)

(c) (- ã,ã) (d) none of these

54. The minimum value of

$$\left(1+\frac{1}{\sin^{n}\sim}\right)\left(1+\frac{1}{\cos^{n}\sim}\right)$$ is :

(a) 1 (b) 2

(c) $(1+2^{n/2})^2$ (d) none of these

55. The value of k so that $x^2+y^2+kx+4y+2 = 0$ and $2(x^2+y^2)-4x-3y+k = 0$ cut orthogonally is :

(a) $\frac{10}{3}$ (b) $-\frac{8}{3}$ (c) $-\frac{10}{3}$ (d) $\frac{8}{3}$

56. $\lim_{x\to\infty}\left(1-\frac{4}{x-1}\right)^{3x-1}$ is equal to :

(a) e^{12} (b) e^{-12}

(c) e^4 (d) e^3

57. If $A+B+C = 180^0$ then ģ $\tan\frac{A}{2}\ \tan\frac{B}{2}$ is equal to :

(a) 0 (b) 1 (c) 2 (d) 3

58. In a triangle ABC if $b=2, B=30^0$ then the area of the circumcircle of triangle ABC in square units is :

(a) ® (b) 2® (c) 4® (d) 6®

59. If $\sin x + \sin^2 x = 1$, then

$\cos^{12} x + 3\cos^{10} x + 3\cos^8 x + \cos^6 x$ is equal to :

(a) 1 (b) 2 (c) 3 (d) 0

60. If R denotes the set of all real number,then the function f:R → R defined f (x)= $^0 x^0$ is :

(a) one-one only

(b) onto only

(c) both one-one and onto

(d) neither one-one nor onto

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